



National Regulatory
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**Speculation in the Natural Gas Market:
What It Is and What It Isn't;
When It's Good and When It's Bad**

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Executive Summary

Speculation is the activity by which a person or entity attempts to buy cheaply and sell dearly to earn a profit. In commodity markets, such as natural gas, that exhibit high price volatility, speculation helps to allocate risk and provide market liquidity.¹ One common perception is that speculators engage in greedy, antisocial activities that allow them to accumulate significant wealth at the expense of society. (Under this view, speculators tend to drive up prices by manipulating² the market, making them responsible for the scarcity; speculation also can lead to excessively low prices.) Instances have occurred in which speculators have attempted to manipulate the market; in almost every case, however, the culprit ultimately reaped financial ruin.

Speculation in itself is not a bad thing. Good speculation provides a valuable market function. It helps local gas distribution companies and other large gas consumers, for example, to hedge against rising prices, and so to reduce risk—a significant benefit amid highly volatile gas prices and the current economic situation. By the same token, good speculation provides natural gas producers with more predictable future revenues, allowing them to expand with less uncertainty and lower borrowing costs. That trend, in turn, should help to lower the price of natural gas in the long run. Any attempt to curtail good speculation, therefore, is likely to make life harder for firms and raise natural gas prices.³

Even assuming the potential benefits from speculation, most analysts and policymakers consider regulatory oversight of financial derivatives,⁴ such as futures contracts and options, to

¹ Liquidity refers to how quickly, and at what cost, buyers and sellers are able to consummate trades in a specific market. Speculators increase liquidity in financial markets, for example, by allowing hedgers to purchase and sell financial derivatives frequently and in a timely manner. Speculators help to achieve this objective by acting as counterparties to those transactions.

² The CFTC defines manipulation as: “Any planned operation, transaction, or practice that causes or maintains an artificial price.” It defines artificial price as a price “higher or lower than it would have been if it reflected the forces of supply and demand.”

³ As expressed in a recent report of the Commodity Futures Trading Commission, “speculators serve important market functions—immediacy of execution, liquidity, and information aggregation.” See Commodity Futures Trading Commission, *Staff Report on Commodity Swap Dealers and Index Traders with Commission Recommendations*, September 2008, 39.

⁴ A financial derivative derives from a cash market commodity, futures contract, or other financial instrument. Derivatives can be traded on regulated exchange markets or over-the-

be crucial in assuring the integrity of markets against manipulation, abuses and other forms of bad speculation. The regulatory oversight of financial derivatives has met with two types of criticism: (1) the Commodity Futures Trading Commission (CFTC) does not have authority to regulate all financial derivatives, and (2) the CFTC has inadequate resources to carry out its existing responsibilities under the Commodity Exchange Act. The broad responsibility of the CFTC is to ensure that financial derivatives in commodities such as natural gas are functioning efficiently and fairly and that derivative prices are trustworthy, that is, free of manipulation. Criticism has centered on the inability of the CFTC to fulfill this responsibility without broader jurisdiction to oversee financial derivatives other than futures contracts. Other criticism has focused on the alleged inability of knowledge, expertise, and technology of CFTC and regulation in general to keep pace with robust market activity. Overall, critics contend that, for these reasons, actual manipulation may be much more prevalent than reflected in the number of manipulative cases uncovered by regulators.

One policy issue before the U.S. Congress is the proper role of federal regulators in controlling speculation to prevent the possibility of a bubble. One common definition of a speculative bubble is cumulative movement in the price of a financial asset whose price is high largely because speculators believe the price will rise even further. Usually the high prices are unsustainable, with the bubble bursting and prices dropping precipitously at some unpredictable time. As one expert has noted, bubbles result from “contagious optimism, seemingly impervious to facts that often take hold when prices are rising.”⁵ Supporters of additional governmental intervention contend that speculators have caused prices for commodities like oil and natural gas to fluctuate widely, especially in their dramatic rise during 2008, harming consumers and disrupting commodity markets in the process. They have called for limits on speculation beyond those currently in place under existing federal legislation and regulation. Congress has debated whether it should enact new legislation to impose tighter limits on financial speculation in energy markets. Opponents of more stringent limits on speculation warn that these limits can reduce market liquidity and hedging opportunities for market participants who place a high value on managing their price risk.

The major purpose of this paper is to address basic questions about speculation in commodity markets, especially the natural gas and oil markets. Policymakers, analysts, and other market observers have expressed opinions on what effect increased speculation has had on commodity markets. These opinions diverge with different implications for appropriate public policy and other actions the government might take. Those who see speculation as almost always benign or beneficial to markets and society in general tend to advocate light-handed

counter. For example, futures contracts are derivatives of physical commodities, options on futures are derivatives of futures contracts.

⁵ See Robert J. Shiller at <http://www.theatlantic.com/doc/print/200807/housing>

regulation of this market activity. Skeptics of speculation support more stringent regulations, particularly in limiting speculative positions to mitigate manipulation and a “bubble” phenomenon.

This paper focuses on energy, natural gas in particular. Natural gas prices have exhibited wide fluctuations since the beginning of this century, with particularly pronounced price variability during 2008. Partially because of the weak short-run response of gas supply and demand to price changes, even moderate changes in market conditions can produce large fluctuations in price. This tendency was evident during 2008, when prices rose sharply early in the year and then fell almost as sharply starting around early summer. A number of industry observers blame speculation in financial derivatives by noncommercial market participants (e.g., hedge funds, pension funds, and other institutional investors) for the volatility and rise in natural gas prices.⁶ Industry, regulatory, and other analysts disagree, however, on whether, and to what extent, speculation has affected energy prices. In response to the erratic movement in natural gas prices during 2008, NARUC formed a Working Group of state commissioners to examine various questions relating to speculation in natural gas markets.⁷

This paper does not take a definite stance on the desirability of speculation and what constitutes optimal public policy. It aims, instead, to educate state commissions on the basics of speculation and why speculation has emerged as an issue in commodity markets. (The appendix contains elementary terms associated with commodity financial markets and their regulation that should aid the reader in better understanding the content in this paper.) The reader, after reviewing this paper, should know the difference between socially desirable (“good”) and undesirable (“bad”) speculation. The reader also should better understand the reasons for the flows and ebbs of natural gas prices, of which speculative activity is one possible factor. With this knowledge, state commissions should improve their ability to take appropriate action.

One such action might include urging Congress and federal agencies to more aggressively and effectively prevent bad speculation, however that term is defined. Another state commission action might include questioning gas utilities about: (1) whether they have conducted any analysis of the effect of financial speculation (relative to physical supply-and-demand factors) on market gas prices and, if so, (2) how the analysis affected their gas procurement and hedging decisions.

⁶ The Commodity Futures Trading Commission (CFTC) defines noncommercial investors as those investors who are not physically exposed to the commodity but trade “with the objective of achieving profits through the successful anticipation of price movements.”

⁷ The Working Group’s mission is as follows: (1) to educate NARUC and state commissions about speculation in natural gas markets, (2) to monitor federal actions on speculation in natural gas markets, and (3) to recommend policies to NARUC via resolutions. At its 2008 Summer Meetings, NARUC passed a resolution on Pricing and Speculation in Natural Gas Markets. See <http://www.naruc.org/meetingresolutions.cfm?2008-07-23>.

Table ES1 lists ten questions on speculation and its regulation by the federal government. It also provides brief responses to those questions that this paper discusses in more detail. One major conclusion of this paper is that while normal speculation in markets should not cause concern to policymakers, problems can arise when (1) regulation inadequately oversees the commodity financial markets, and (2) “herd” behavior causes a speculative bubble to develop and disrupt the efficient operation of a commodity market.

This paper is available electronically at http://nrri.org/pubs/gas/speculation_gas_nov08-11.pdf.

Table ES1. Ten Questions on Speculation and General Responses

Question	General Response
1. Has financial speculation in commodity markets increased during the past two to three years?	Market investors have shifted their money out of stocks, bonds, and real estate to commodity financial derivatives to maximize their risk-adjusted returns as well as to hedge.
2. Does speculation normally improve market performance and efficiency?	Speculation, when performed without manipulation, can improve market liquidity, efficiently absorb new information into prices, and allow for more hedging. Such speculation also improves price efficiency by accounting for both present and future expectations about physical commodity supply and demand conditions.
3. Would speculators like to manipulate markets if they could?	Just as firms would benefit from having market power, speculators would benefit from artificially moving prices in their favor.
4. Is speculative manipulation difficult, especially in achieving sustainable success for the manipulator?	Manipulation requires restrictive (i.e., inefficient market) conditions, which have a low probability of occurring. But when such conditions exist, manipulation is a real possibility.
5. Do speculators attempt to profit from buying low and selling high?	Profits to speculators correspond to the difference between the price at which they sell a financial derivative and the price they paid for it.
6. Can speculation lead to higher current prices, with a speculative bubble exacerbating price movements?	Speculation can lead to hoarding of current supply for future consumption, or push current spot prices up because of arbitrage with futures prices.
7. Do regulatory gaps presently exist in the oversight of financial derivatives?	Uneven, and in some instances minimal, regulation of financial derivatives—for example, those derivatives traded over-the-counter.
8. Have market promptness and efficiency in absorbing information increased the demand for, and importance of, both hedging and speculation?	Price volatility increases as the market responds more quickly to new information, placing a greater demand on managing price risk.
9. Does hedging require a counterparty (“it takes two to tango”)?	Speculators frequently act as a counterparty in hedging transactions, taking on the risk shifted from the hedger.
10. Do experts agree on the effect of financial speculation on commodity prices?	Analysts and others differ over the interpretation of the high correlation between speculative activity, changes in trading volume, and changes in commodity prices.

Table of Contents

Executive Summary	iii
I. Purpose of this paper	1
II. Tutorial on speculation in commodity markets: truths, myths and unknowns	3
A. The social benefit of good speculation in commodity markets	3
B. Players in financial derivative markets, their business motivations, and their practices	8
C. The difference between socially desirable (“good”) speculation and socially undesirable (“bad”) speculation	11
D. Federal regulation of speculation	13
1. The rationale for regulatory oversight	13
2. The regulatory structure: CFTC, FERC, NYMEX, and Congress	14
E. Theoretical arguments, assertions, and evidence on the effect of speculation on commodity prices	16
1. Distinction between short- and longer-term effects	16
2. Socially desirable versus socially undesirable price effects	17
III. Current issues and concerns about speculation in energy markets	19
A. Several factors explain the movement and volatility of natural gas and oil prices	19
B. A call for Congressional action and its rationale	23
IV. Options for public utility commissions	25
Appendix: Glossary of Terms	28

Speculation in the Natural Gas Market:

What It Is and What It Isn't; When It's Good and When It's Bad

I. Purpose of this paper

This paper addresses basic questions about speculation in commodity markets, especially the natural gas and oil markets. Policymakers, analysts, and other market observers have expressed opinions on what effect increased speculation has had on commodity markets. These opinions diverge with different implications for appropriate public policy and other actions the government might take. Those who see speculation as almost always benign or beneficial to markets and society in general tend to advocate light-handed regulation of this market activity. Skeptics of speculation support more stringent regulations, particularly in limiting speculation positions.

The paper will address several questions relating to speculation, in many instances not providing definite answers but only elaboration of other analysts' positions. These questions are:

Basic questions about speculation

1. What role does speculation play in commodity markets?
2. How do the objectives and strategies of hedgers and speculators differ in their buying and selling of financial derivatives?
3. When is speculation socially desirable? When is it socially damaging? When does speculation lead to more efficient prices and market operations? When does it lead to distorted prices and less efficient market operations?
4. How do more recent noncommercial speculators (e.g., "index speculators") differ from traditional speculators in their purchasing and selling strategies for financial derivatives in commodities?
5. How can financial speculators manipulate prices and act abusively in financial derivative markets? What motivations do they have to engage in this behavior?
6. What do empirical evidence and economic theory suggest about the effect of financial speculation on price stability?

Federal regulations and activities

1. How effective is the Commodity Futures Trade Commission (CFTC) in carrying out its responsibility to prevent manipulation and other abuses in commodity futures markets?
2. How effective are federal regulations, taken as a whole, in preventing manipulation and other abuses in commodity financial-derivative markets? What problems have arisen?
3. What recent actions, if any, have Congress taken in addressing these problems?
4. What authority does the Federal Energy Regulatory Commission (FERC) have in overseeing the transaction of financial derivatives in energy commodities? What is their jurisdiction in relationship to CFTC's?
5. Should federal regulations expand their scope to limit conditions conducive to speculative bubbles? If so justified, how can regulations best, and with minimal distortions, prevent speculative bubbles?

Current issues and concerns over speculation

1. What evidence is available showing the effect of speculation on natural gas prices or the prices of other commodities such as oil and agricultural products?
2. What explains the disagreement among analysts and market participants on the effect speculation has had on commodity prices, including prices for oil and natural gas?
3. What effect have noncommercial speculators (e.g., hedge funds, managed money accounts) had on market liquidity, price, and other areas of performance for the natural gas sector?
4. What factors have caused the roller-coaster movement of natural gas prices in 2008? Has financial speculation been a contributing factor? Should we expect financial speculation in natural gas to have a large effect on future price levels and volatility?

This paper does not take a definite stance on the desirability of speculation and what constitutes optimal public policy. It aims, instead, to educate state commissions on the basics of speculation and why speculation has emerged as an issue in commodity markets. The reader, after reviewing this paper, should understand the difference between socially desirable and undesirable speculation. The reader also should better understand the reasons for the flows and ebbs of natural gas prices, of which speculative activity is one possible factor. With this knowledge, state commissions should improve their ability to take appropriate action. One such action might include urging Congress and federal agencies to more aggressively and effectively prevent undesirable speculation, however that term is defined.

This paper will discuss what constitutes “bad speculation,” a term with different interpretations among policymakers and financial experts. At the minimum, bad speculation results from the intent of speculators to artificially manipulate the price of a financial derivative away from that which demand and supply factors would determine. A broader definition of bad speculation implies more extensive, and perhaps a different form of, regulation. This definition might include speculation that can lead to a bubble condition conducive to highly volatile prices.⁸ Such volatility might have an adverse effect on the general economy.

II. Tutorial on speculation in commodity markets: truths, myths and unknowns

A. The social benefit of good speculation in commodity markets

A speculator enters the market to make a profit from the buying and selling of a commodity or a financial instrument associated with the commodity. The Commodity Futures Trading Commission (CFTC) defines a speculator as “an individual who does not hedge, but who trades with the objective of achieving profits through the successful anticipation of price movements.”⁹ Speculation can therefore involve either a financial or a physical asset. This paper refers to the former as “financial speculation” and the latter as “physical speculation.” A speculator in natural gas, for example, might purchase a futures contract today believing that at expiration in six months it will sell for a higher price, making a profit in the process. A speculator alternatively might buy and store natural gas today expecting to resell the gas in the future at a higher price. The adage “buy cheap, sell dear” readily applies to both financial and

⁸ Some analysts define a speculative bubble as an unsustainable increase in prices caused by investors’ “bandwagon” buying behavior, rather than by future physical supply-and-demand information. In other words, a speculative bubble results in prices far removed from prices reflective of a commodity’s physical supply-and-demand conditions.

⁹ A recent CFTC report uses the term “commercials” to represent market participants who engage in both hedging and speculation. A clear demarcation thus does not exist between hedgers and speculators. (See Futures Trading Commission, *Staff Report on Commodity Swap Dealers and Index Traders with Commission Recommendations*, September 2008.)

The CFTC has a glossary of terms associated with the futures markets and its regulation; the reader can access the glossary at <http://www.cftc.gov/educationcenter/glossary/index.htm>. The CFTC as a commission has never expressed formally its definition of speculation. The first page of the CFTC glossary contains a disclaimer that reads in part: “Definitions are not intended to state or suggest the views of the Commission concerning the legal significance or meaning of any word or term and no definition is intended to state or suggest the Commission’s views concerning any trading strategy or economic theory.”

physical speculation. A speculator takes on risk that another market participant wants to shed. While a hedger wants to lock in a guaranteed price—for example, pay a known price for a future supply of natural gas—a speculator wants the price to increase. The speculator only benefits when correctly predicting the direction of price changes. A speculator takes risks only if he anticipates a reasonable opportunity to gain a profit from doing so.

Speculators provide liquidity to the market. This liquidity facilitates hedging, which requires someone to shoulder the risk that a hedger wants to shed.¹⁰ That someone is a speculator. If a market had no speculators, hedging with financial instruments could not exist—hedging requires a counterparty that is willing to take on the risk unwanted by the hedger. A gas utility wishing to hedge with a financial contract must find a seller who speculates that the market price will move in a direction that would allow him to profit. For those who look favorably upon speculation, speculators provide the vital service of helping producers and consumers to hedge against price movements that could jeopardize their economic well-being. Hedging, for example, contributes to more predictable future revenues for producers and more predictable future costs for consumers. These consumers include commercial and industrial entities as well as households.

Good speculation would help to efficiently allocate a commodity such as natural gas across different periods. Today's decisions depend not only on present supply and demand but also on the expectations for future market conditions. Good speculation, for example, could moderate future prices by storing more of a commodity presently to release in a future period when the market expects supply reductions.

Some speculators follow market trends, buying as prices rise and driving them higher, then reselling at those higher prices. Other speculators may buy when they think prices have fallen too low, and sell when they see prices as too high. Speculators also can go “short” and make money by buying low and selling high. Unlike speculators who go “long,” a short position involves selling first and then buying. The hope is that the price of a financial derivative will fall over time. Going “short” requires a speculator to sell borrowed financial derivatives and agree to return them later.

A conspicuous trend in commodity markets is noncommercial entities doing more of the speculation. Investment money in recent years has shifted away from stocks, bonds, and real estate to commodity financial derivatives. These entities include hedge funds, pension funds, investment banks, and other institutional investors that take no physical position. Their sole purpose is to profit from speculative activities. Some analysts have contended that the large amount of capital poured into commodity markets, including oil and natural gas, have lowered prices and their volatility. Other analysts disagree, saying that increased speculation has had the

¹⁰ The CFTC views liquidity in relationship to “the ability to buy and sell futures contracts quickly without materially affecting the price.” See <http://www.cftc.gov/educationcenter/economicpurpose.html>.

opposite effect by causing extreme highs in commodity prices in addition to more volatile prices. Some analysts have contended the existence of a speculative bubble in some commodity markets.¹¹

Some analysts portray a speculative bubble as a psychological phenomenon in which individual investors may be acting rationally but, collectively, the market produces outlandish results. Many academics attribute speculative bubbles to what is called “information cascades.” This term refers to an investor relying on information conveyed by other investors to make her own decision. An example: “If everyone else is buying at high prices, they must know something I don’t know; I will therefore also invest and pay a high price.” Another example is when the bubble bursts because rational investors become inexplicably pessimistic as they observe other investors bidding down asset prices to ridiculously low levels.¹² This behavior reflects a “herd” mentality; that is, otherwise rational people becoming caught up in something that results in what some analysts call “irrational exuberance.”

If a speculative bubble does in fact reflect the foregoing behavior—arguably a form of market failure—then government regulation to combat it becomes tenable. Regulation may come in the form of limits on the amounts that people can invest with borrowed money. The premise underlying such a regulation is that speculative bubbles can cause serious problems for both the commodity market and the economy as a whole when investors can easily borrow to expand their asset holdings. An excessive run-up or decline in asset prices, for example, can have important consequences for the economy as investors respond to the price signals, causing capital misallocation across the different economic sectors. By magnifying the volatility of asset

¹¹ A recent study by an MIT economist concluded that:

Since there is no reason based on current and expected supply and demand that justifies the current price of oil, what is left? The oil price is a speculative bubble. This is an idea that has some backing in financial circles, e.g. George Soros. The spiking price pattern would, itself, suggest it. It is well known that hedge funds are very active in the oil market and their activity, along with other speculators, has raised the volume of oil transactions far above the volume warranted by ordinary commercial transactions. Have the rapid price increases lasted so long that the impetus cannot be just speculative? Well speculative bubbles can last a long time. Think of the dot com bubble or the bubble in housing prices. Is a speculative bubble irrational? No, it is rational to ride along and trade in a speculative bubble as long as it is expanding. The moment of truth comes only at the end, when the bubble bursts. R.S. Eckaus, “The Oil Price Really Is a Speculative Bubble,” MIT Center for Energy and Environmental Policy Research, Working Paper 08-007, June 2008, 8.

¹² See, for example, Robert J. Shiller, “How a Bubble Stayed Under the Radar,” *The New York Times*, at <http://www.nytimes.com>, March 2, 2008.

prices, a speculative bubble also can harm those market participants who are averse to uncertainty and fluctuations.

Speculation in a market can drive up current prices, even in the absence of manipulation and a “bubble” phenomenon. Take the example in which the market expects the possibility of a massive hurricane two months hence, which hurricane would destroy a significant proportion of natural gas production capacity in the Gulf region. The market would respond by: (1) storing more natural gas today (assuming the availability of storage capacity), which leaves less natural gas supplies for current consumption; and (2) driving up the price of futures contracts for the periods in which the expected supply cutbacks will occur. Each of these responses would tend to increase today’s spot price.¹³ Lower release of stored gas, for example, would leave less natural gas available for current consumption. Higher futures prices would raise current spot prices to achieve an arbitrated equilibrium between the two prices. Futures prices reflect market-consensus estimates that emerge from the trading activity of many parties. As expressed by one source, “The futures market . . . distills the diverse views of market participants into a single price . . . [These] participants buy or sell a futures contract at the price they believe the commodity will sell for on the delivery date.”¹⁴ The market relies on the New York Mercantile Exchange (NYMEX) futures prices as pricing benchmarks for wholesale contracts and other commercial transactions.¹⁵ As noted on the CFTC website, “Futures contracts are often relied on for price discovery as well as for hedging. In many physical commodities . . . cash market participants base spot and forward prices on the futures prices that are ‘discovered’ in the competitive, open auction market of a futures exchange.”¹⁶

¹³ To say it differently, expectations of lower future natural gas supply would create an additional demand for the future delivery of natural gas. One outcome is an upward movement in price sooner than what would have occurred otherwise. Higher current or near-term prices will stimulate additional natural gas production, an increase in natural gas storage, and less consumption of natural gas.

¹⁴ United States Government Accountability Office, *Energy Derivatives: Preliminary Views on Energy Derivatives Trading and CFTC Oversight* (GAO-07-1095T), July 12, 2007, 4.

¹⁵ NYMEX is the world’s largest physical commodity futures exchange and the preeminent trading forum for energy and metals. NYMEX first offered gas futures contracts in April 1990. Options on gas futures contracts began trading in 1992. For a discussion of how local gas distributors use futures contracts and options for hedging, see the NRRI report *Use of Hedging by Local Gas Distribution Companies: Basic Considerations and Regulatory Issues*, at <http://nrri.org/pubs/gas/01-08.pdf>.

¹⁶ See <http://www.cftc.gov/educationcenter/economicpurpose.html>. As a general rule, futures prices should approximate the spot price plus the storage cost from carrying the commodity forward to the delivery date of the futures contract. Some analysts, however, question this relationship because of what is called the “convenience yield” for storing a

The example of increased speculation causing higher current prices produces a social gain. It is this benefit that normally makes speculation a productive activity from society's perspective. This benefit takes the form of lower future prices and a more efficient allocation of the commodity across time periods. Future prices will be lower because more of the current stored gas will be available for future consumption. This gas helps to alleviate the supply shortfall caused by a hurricane. Because of the higher current price, less gas is consumed today, which also leaves more supplies available during future "shortage" periods. Overall, under this scenario, speculation helps to reallocate the inventory of natural gas for current consumption to future periods where the market expects shortages or merely more scarcity. One salient outcome is more stable prices over diverse time periods.¹⁷ In contrast to the popular perception, speculation, when done without manipulation or abuse, or in the absence of a bubble, would tend to have a price-stabilizing effect. The simultaneous increases in futures prices and the current spot price reflect the expectation of a smaller stock of natural gas in the future. A similar outcome would occur if new market expectations developed (as a result of new forecast information) that called for a larger increase in demand for natural gas than previously expected. Another argument why speculation should cause more stable prices over time derives from the following logic: speculators benefit when they buy low and sell high; when they follow this rule, they raise low prices when they buy, and they lower high prices when they sell; thus, profitable speculation decreases price volatility.

The natural gas industry lends itself to hedging and speculation, whose benefits to market participants positively correlate with the degree of price volatility and unpredictability. First, prices fluctuate widely partially because of low short-term price elasticities of demand and supply. This weak price response can cause a noticeable movement in price even when market conditions exhibit little change. Second, natural gas markets quickly process new information on market conditions; this processing means that prices can fluctuate frequently and sharply, thus creating more market demand for hedging and speculation. Third, large amounts of natural gas storage are feasible and economical. Physical speculation by marketers, for example, can take place on a large scale, as they store natural gas and in the process remove supply from current consumption with the expectation of profiting from selling the gas later at a higher price.

commodity. Storage, for example, can reduce supply interruptions and help to meet an unexpected shift in demand. These benefits would tend to increase the spread between futures prices and the future spot price.

¹⁷ The late economist Milton Friedman once noted that if speculators are making money, then speculation should have a stabilizing effect on prices. If, for example, a speculator expects price to rise, she will buy today. By buying, the current price increases. If she actually makes money, the result is that the spread between the current and future prices is lower; thus, prices are more stable between the two periods than if no speculation occurred.

B. Players in financial derivative markets, their business motivations, and their practices

Both commercial and noncommercial entities participate in financial derivative markets. According to the CFTC, a commercial entity is involved in the production, processing, or merchandising of a commodity. In the natural gas sector, commercial entities would include producers, marketers, local distribution companies, and retail consumers. These entities usually purchase or sell financial derivatives such as futures contracts, options, and swaps for hedging. A natural gas producer may sell a futures contract to set a price floor on the gas it sells for some future period.¹⁸ A local gas distributor may purchase a futures contract to set a price cap on the gas it buys for some future period. It typically would purchase futures contracts to cover future months' requirements and to lock in a future price. When the month for which the utility requires physical gas approaches, it will sell its futures contract and purchase physical gas. As the two transactions occur almost simultaneously, their prices cancel each other (with a "basis" adjustment to account for the difference in the spot price at the Henry Hub and the local delivery point). The result is that customers pay the original price of the futures contract for the physical gas they purchase from the utility. Financial derivatives such as futures contracts and swaps have advantages over forward (physical) contracts by being more liquid and having lower transaction costs.

Commercial entities, other than for hedging, also rely on financial derivative markets for price discovery. Price discovery involves determining the price level for a commodity, either in the spot or futures market, based on market conditions. Both hedgers and speculators look to the futures exchanges for information that reflects market expectations of supply, demand and prices.¹⁹

¹⁸ According to a recent press release from Chesapeake Energy Corporation, for example, "For the 2008 fourth quarter and for the full years 2009 and 2010, Chesapeake has hedged through swaps and collars approximately 81%, 72% and 46% of its expected natural gas and oil production at average prices of \$9.50, \$9.63 and \$9.89 per thousand cubic feet of natural gas equivalent (Mcf), respectively." See Chesapeake Energy, "Chesapeake Energy Corporation Announces 2008 Investor and Analyst Meeting Major Topics," *News Release*, October 10, 2008.

¹⁹ A recent CFTC report commented that:

The price discovery function of futures markets is extremely valuable for commercial enterprises in terms of planning business activities and for allocating resources. The availability of publicly observed futures prices for several years into the future makes it possible to recognize, plan, and finance needed business adjustments in supply and demand early on. This, in turn, may help reduce price volatility. Price volatility is often higher in markets without a successful exchange-traded futures contract, such as those for fertilizers, coal, tea and onions. See Commodity Futures Trading Commission, *Staff Report on*

A last comment on commercial entities is that their speculation activities may include manipulation or attempted manipulation. “Manipulation” cases in energy markets brought before the CFTC have involved “commercial” traders. These traders may be in a better position to manipulate than other traders because of their more direct involvement in market activities.

Noncommercial entities, by definition, do not take any physical positions on the commodity in question. They include short-term speculative traders in addition to other traders with different market strategies and longer time horizons. Their motivation is solely to make money in financial derivatives. These derivatives can comprise part of a portfolio containing different financial assets for a selected group of commodities. Some analysts call investors in these portfolios “index speculators.”²⁰ Unlike traditional speculators, index speculators use what a recent CFTC report calls “a passive investment strategy that attempts to replicate the return on an index of commodities by holding futures positions in correspondence to their weight in a specified commodity index.”²¹ The objective of a commodity index trader, according to the CFTC report, is to “track an index of commodities over time by acquiring long positions via [over-the-counter] swap contracts, index funds, or exchange-traded futures.”

One example of a commodity index trader is a pension fund. The fund may include financial commodity assets as well as bonds and stocks. Investing in oil futures, for example, can reduce risks against inflation, the weakening of the dollar, and a fall in the stock and bond markets. As one large pension fund has expressed, investing in commodity futures is part of a “new strategy to provide a hedge against inflation while diversifying investments, thus mitigating losses during equity market downturns.” While a commodity financial asset can act

Commodity Swap Dealers and Index Traders with Commission Recommendations, September 2008, 38.

²⁰ Blame directed toward “index speculators” for the dramatic rise in oil prices during 2008 has come from different quarters. See for example, Michael W. Masters, *Testimony before the Committee on Homeland Security and Governmental Affairs, U.S. Senate*, May 20, 2008; and Joe Lieberman, Susan Collins, and Maria Cantwell, “Commodity Speculation Must Be Curbed,” *Financial Times*, at <http://www.ft.com>, July 25, 2008. Masters identifies a unique trait of “index speculators:”

One particularly troubling aspect of Index Speculator demand is that *it actually increases the more prices increase*. This explains the accelerating rate at which commodity futures prices (and actual commodity prices) are increasing. Rising prices attract more Index Speculators, whose tendency is to increase their allocation as prices rise. So their profit-motivated demand for futures is the inverse of what you would expect from price-sensitive consumer behavior (at 5).

²¹ Commodity Futures Trading Commission, *Staff Report on Commodity Swap Dealers and Index Traders with Commission Recommendations*, September 2008, 65.

as a hedge within a pension fund portfolio, the fund purchases the asset for speculative purposes;²² that is, the fund expects to profit from the asset's increasing in value over time.²³

The CFTC expressed in a recent report that:

The type of trading conducted by noncommercial traders has ... changed significantly over time. For example, in the NYMEX crude oil market, a vast majority of noncommercial traders do not take direct long or short positions in the market where they would benefit directly from prices rising or falling. Rather, most noncommercial traders place spread positions, which amounts to simultaneously buying and selling in different months to trade on pricing relationships over certain time horizons. Spread trading for NYMEX Crude Oil with equal and offsetting long and short positions has grown from roughly 10 percent of the market to over 40 percent of the market today.²⁴

A report by NYMEX argues that noncommercial traders have a small effect on price:

[The] requirement that non-commercials must engage in offsetting trades before contract termination of the listed contract month for the applicable futures contract has . . . strong implications as to price impacts. If one chooses to accept the logic that, *all other things being equal*, initiation of positions in the market by non-commercials exerts a price influence—i.e., initiating a purchase raises the price from what it otherwise would have been or initiating a sale lowers the price similarly, then one must equally accept the notion that the action of liquidating the position, which must eventually be performed by all non-commercials, exerts the reverse price influence. The unavoidable conclusion of non-commercials being unable to perform delivery is that the net impact of their trading should be neutral

²² A commodity financial asset can act as a hedge against inflation and movement in the prices of other assets in the portfolio, such as stocks and bonds. This assumes a negative correlation between the price of stocks/bonds and the price of commodities (which empirical evidence supports). Thus, a portfolio manager can reduce risk by including both commodity financial assets and stocks and bonds in a portfolio.

²³ "Index speculators," as pointed out in a CFTC report, care less about predicting future prices than about capturing a commodity exposure that will diversify a portfolio. Commodity Futures Trading Commission, *Staff Report on Commodity Swap Dealers and Index Traders with Commission Recommendations*, September 2008, 40.

²⁴ *Ibid.*, 9.

with respect to influencing price. Any other conclusion requires a contrivance in logic.²⁵

The NYMEX report examined the participation of hedge funds in crude oil and natural gas futures markets during 2004. The study focused on the influence of hedge fund participation on price volatility and included a statistical test for causality. The findings were that hedge fund participation did not aggravate volatility; if anything, the evidence points to a dampening of volatility.

Parts II and III of this paper discuss an opposing view held by some market experts and observers—that the proliferation of noncommercial speculators in commodity markets has led to what is called “excessive speculation” and dramatic price changes. Wide disagreement exists as to the effect of noncommercial speculators on commodity prices. One issue before Congress is whether to enact stricter limits on speculation, especially for energy commodities. Good public policy dictates weighing the benefits of stricter limits against the costs. This paper will shortly examine these benefits and costs more closely.

C. The difference between socially desirable (“good”) speculation and socially undesirable (“bad”) speculation

As with most economic activities, from a societal perspective speculation can produce either positive or negative results. In other words, speculation is inherently neither good nor bad; it depends. Speculation can improve the efficiency of markets by reallocating market risk and stabilizing prices. It provides the market with more liquidity, which facilitates hedging by market participants who wish to reduce price risk. Excessive constraints on speculation, therefore, could reduce market liquidity, limit the ability of hedgers to manage risks, and restrict information for price discovery.

Speculation carried to an extreme or tainted with manipulative intent, on the other hand, can harm society. The latter situation occurs when speculators attempt to manipulate the market by distorting prices with the goal of earning higher profits from the sale or purchase of a financial asset. The harm done can affect the physical commodity market when it relies on futures prices and the prices of other financial derivatives. That is to say, the market uses these prices for price discovery and benchmarking of a contractual price. If, for example, manipulation artificially raises natural gas futures prices, buyers of contractual gas (with futures prices acting as the reference price) would pay a higher price. A 2006 U.S. Senate investigation expressed that:

The case law interpreting the [Commodity Exchange Act’s] prohibitions against market manipulation is confusing and contradictory. The current test for

²⁵ New York Mercantile Exchange, *A Review of Recent Hedge Fund Participation in NYMEX Natural Gas and Crude Oil Futures Markets*, March 1, 2005.

establishing manipulation requires the following four elements to be established by a preponderance of the evidence: (1) the accused had the ability to influence market prices; (2) the accused specifically intended to influence market prices; (3) artificial prices existed; and (4) the accused caused the artificial prices.²⁶

“Excessive speculation” is problematic to some market analysts when associated with the concept of “speculative bubble.” The CFTC defines a speculative bubble as “a rapid run-up in prices caused by excessive buying that is unrelated to any of the basic, underlying factors affecting the supply or demand for a commodity or other asset. Speculative bubbles are usually associated with a ‘herd or bandwagon’ effect in which speculators rush to buy the commodity . . . before the price trend ends, and an even greater rush to sell the commodity . . . when prices reverse.”²⁷ A speculative bubble inflates the price of a commodity beyond (sometimes far beyond) the level that would reflect only physical supply-and-demand conditions. Experience has shown that a bubble can develop when speculators’ domination of a market evolves into “herd” mentality

A speculative bubble results in high price volatility, with likely consequential effects (both positive and negative) on market participants. When prices move quickly upward, for example, speculators benefit while consumers of a commodity would pay more and be worse off. While wide agreement exists as to the merits of regulation to combat manipulative speculation, less consensus occurs as to whether and how to regulate speculative bubbles. Congressional testimony by the Chief Economist of the CFTC expressed it this way:

While speculation is critical to well-functioning markets, excessive speculation can be detrimental to the markets. Under Section 4a of the [Commodity Exchange Act, or CEA], the concept of “excessive speculation” is based on trading that results in “sudden or unreasonable fluctuations or unwarranted changes in the price” of commodities underlying futures transactions. The CEA specifically makes it a violation of the Act to manipulate the price of a commodity in interstate commerce or for future delivery. The CEA does not make excessive

²⁶ Permanent Subcommittee of Investigations, United States Senate, *Excessive Speculation in the Natural Gas Market*, Staff Report, with Additional Minority Staff Reviews, 2007, 47.

²⁷ See <http://www.cftc.gov/educationcenter/glossary/index.htm>. As indicated in footnote 9, however, the definitions in the CFTC website glossary do not represent the official views of the Commission.

speculation a *per se* violation of the Act, but rather, requires the [CFTC] to enact regulations to address such trading (for example, through speculative position limits).²⁸

One interpretation of this statement is that the CFTC sets limits on speculation only to prevent manipulation by an individual speculator or a group of colluding speculators.²⁹ The limits arguably do not address the total amount of speculation in a commodity market. What this interpretation means is that the CFTC directs its actions only at preventing market manipulation and other abuses that could lead to artificial prices. The CFTC website contains the statement that “the CFTC's mission is to protect market users and the public from fraud, manipulation, and abusive practices related to the sale of commodity and financial futures and options, and to foster open, competitive, and financially sound futures and option markets.” It is not clear what the CFTC’s role is with regard to speculative bubbles. The CFTC presently may not have a direct mandate to combat speculative bubbles. Recent Congressional legislation, besides enhancing the capability of the CFTC to detect and prevent manipulative speculation, would impose obstacles on the aggregate level of speculation, supposedly to eliminate the possibility of speculative bubbles. The underlying premise beyond this legislation is that speculative bubbles have a high social cost, irrespective of whether conditions for market manipulation exist.

D. Federal regulation of speculation

Both the CFTC and the Federal Energy Regulatory Commission (FERC) have regulatory authority over market manipulation in natural gas markets. In October 2005, the CFTC and FERC entered into a Memorandum of Understanding to coordinate separate investigations of markets pertinent to their respective jurisdictions. NYMEX also self-regulates futures and options activities, with CFTC oversight and guidance, in order to ensure market transparency and to prevent manipulation, abuse, and other market problems.

1. The rationale for regulatory oversight

The rationale for regulating futures markets and other financial derivatives lies with the potential for speculators to manipulate markets to their economic advantage and at a cost to other market participants and the economy as a whole. Early regulation of the futures markets for agricultural products resulted from the perception that those markets were vulnerable to

²⁸ Jeffrey Harris, *Written Testimony before the Committee on Energy and Natural Resources United States Senate*, April 3, 2008, 8-9.

²⁹ The CFTC defines on its website speculative limit as “the maximum position, either net long or net short, in one commodity future (or option) or in all futures (or options) of one commodity combined that may be held or controlled by *one person* (other than a person eligible for a hedge exemption) as prescribed by an exchange and/or by the CFTC.” (Emphasis added)

manipulation and misinformation by traders. These malicious actions had the intent of moving prices in a direction favoring those traders who had a dominant position.

In a presentation, a CFTC staff member identified two forms of manipulation by speculators: (1) corners and squeezes, in which a speculator offsets a futures position at a price higher than otherwise possible;³⁰ and (2) “beneficial pricing,” in which by inflating futures prices, a trader can increase the price for physical contracts and over-the-counter swaps (many of these transactions use the futures price as the basis for pricing).³¹

Although instances of actual and alleged market manipulation are well documented, their occurrences require restricted conditions.³² These conditions include: (1) a single speculator (or group of conspiring speculators) operating on a sufficiently large scale to have influence over price, and (2) other traders who have an information disadvantage continuing to transact with the manipulator even though it is to their disadvantage.

2. The regulatory structure: CFTC, FERC, NYMEX, and Congress

Congress enacted the Commodity Exchange Act in 1936, originally giving authority over the oversight of futures markets to the U.S. Department of Agriculture. The driving force behind the Commodity Exchange Act was: (1) to protect the price discovery function; (2) to prevent the manipulation of commodities through corners, squeezes and similar schemes; and (3) to ensure an effective vehicle for risk transference.

Congress formed the CFTC in 1974 as an independent agency with the mandate to regulate commodity futures and option markets in the United States. The agency's mandate has changed over time, most notably in recent times by the Commodity Futures Modernization Act of 2000 (CFMA). The CFTC's mission is to (1) protect markets and the public from fraud, manipulation, and abusive practices associated with the sale of commodity and financial futures and options; and (2) advance open, competitive, and financially sound futures and option

³⁰ The CFTC defines a *corner* as an activity “(1) securing such relative control of a commodity that its price can be manipulated, that is, can be controlled by the creator of the corner; or (2) in the extreme situation, obtaining contracts requiring the delivery of more commodities than are available for delivery.” The agency defines a *squeeze* as “a market situation in which the lack of supplies tends to force shorts to cover their positions by offset at higher prices.” See <http://www.cftc.gov/educationcenter/glossary/index.htm>.

³¹ Richard A. Shilts, Presentation to National Association of State Utility Consumer Advocates, November 13, 2007.

³² The most noteworthy cases of market manipulation include: the Hunt brothers' attempt to corner the silver market, the Maine potato market manipulation, the Amaranth incident, and the Sumitomo Company's attempt to corner the copper market.

markets. The objective of the agency's commodity market surveillance and oversight activity is "to deter and prevent price manipulation or any other disruption to market integrity."

For exempt commodities such as natural gas and oil, NYMEX sets speculative limits with CFTC oversight. Speculative limits intend to prevent manipulation by containing the size of positions held by noncommercial participants who do not hedge.³³ Until legislation passed in 2008 (i.e., the Food, Conservation, and Energy Act, also known as the 2008 Farm Bill), the CFTC had no such oversight for electronic energy markets such as the Intercontinental Exchange (ICE). The CFTC did have enforcement authority, however, to prevent manipulation and fraud in electronic energy markets.³⁴

The new legislation increases federal oversight to detect and prevent manipulation by extending the CFTC's authority to electronic energy markets. It, for example, requires the CFTC in those markets to monitor trading of natural gas under contracts that perform a significant price discovery function. The legislation also limits speculation in U.S. electronic energy markets and significantly increases financial penalties for market manipulation and excessive speculation. The latter provision is considered important because of the perception held by many observers that fines for violations were too small relative to the potential gains to traders from manipulating the market.

The Energy Policy Act of 2005 gave FERC new enforcement tools and civil penalty authority to prevent market manipulation and market power abuse in electricity and natural gas markets. The law, according to FERC, gave it explicit rulemaking authority to prohibit and prevent manipulation "in connection with the purchase or sale of natural gas . . . subject to the jurisdiction of the [FERC]."³⁵ FERC articulated in a statement on applying its anti-manipulation rule to a show-cause case involving Amaranth. FERC stated:

³³ Commercial participants who take physical positions generally receive hedge exemptions from speculative limits. The reason for the exemption is that these participants need to offset their futures position with a physical commodity position.

³⁴ CFTC also had the authority to require exempt energy exchanges to provide information on certain contracts.

³⁵ FERC states that:

The Commission's anti-manipulation authority was expanded by the Energy Policy Act of 2005. It provides the Commission the authority to prohibit manipulation, not only by direct participants in the physical natural gas markets, but also where, as in this case, any entity commits manipulation directly, or indirectly, in connection with Commission-jurisdictional transactions. (Federal Energy Regulatory Commission, *Fact Sheet, Docket No. IN07-26-000 Amaranth et al.*, July 26, 2007.)

This case [IN07-26-000] concerns the important nexus between the wholesale interstate natural gas markets subject to the Commission's jurisdiction and the New York Mercantile Exchange Natural Gas Futures Contract. In recent years, many market participants in the physical natural gas markets have used the [natural gas] Futures Contract as a significant benchmark for prices in physical natural gas. In this case, *manipulation of Commission-jurisdictional prices resulted from manipulation of the [Natural Gas] Futures Contract.* (Emphasis added)³⁶

E. Theoretical arguments, assertions, and evidence on the effect of speculation on commodity prices

1. Distinction between short- and longer-term effects

Assume that speculators store more natural gas today because of news that potentially could increase the future price. (This is an example of physical speculation.) The news could change expectations about either future demand for natural gas or its supply. An example of such news would be a report indicating that electricity generators will have to rely more on natural gas for new power plants because of setbacks in the development of renewable energy technologies. This news would increase stored gas, which, in turn, would tend to increase the current price, as less natural gas supplies would be available for current consumption. Looking longer term, the increased storage should reduce future prices below what they otherwise would be: additional natural gas would be available in the future from the release of more gas stored today. The overall effect from an increase in storage today is to increase the current price but to lower future prices (during periods when the speculator releases additional stored gas). From a multi-period perspective, this physical speculation would produce more stable prices (i.e., a lower spread between current and future prices). From the consumer's perspective, this speculation would require trading off higher prices today for lower prices tomorrow. Such an outcome commonly occurs on a seasonal basis when gas utilities and other market providers store gas during the non-winter months to shift additional gas supplies to the winter heating season. That is, prices rise above what they otherwise would be if no storage occurred during the non-winter season; but they fall below what they otherwise would be during the winter season.

In the instance of financial speculation, the effect on commodity prices is evident as well. Assume, for example, that speculators purchase more natural gas futures contracts today because of news that would increase the future spot price of natural gas (for example, geological reports of a smaller amount of gas resources off the Gulf of Mexico than were previously estimated). The increased demand for futures contracts would drive up their prices as well as the current spot price because of arbitrage moving the spot price in the same direction as the futures price. The

³⁶ Federal Energy Regulatory Commission, *Legal Authorities: Amaranth Show Cause, IN07-26-000*, July 25, 2007.

futures price normally should correspond closely to the spot price³⁷ plus the storage cost, interest and insurance cost from carrying the commodity forward to the delivery date of the futures contract. What this relationship means is that when a futures price increases, the current spot price also should increase.

2. Socially desirable versus socially undesirable price effects

When no manipulation or “bubble” condition exists, speculation has the effect of improving price efficiency over a multi-year period. It conveys correct price signals about the scarcity of physical supplies and market expectations of future conditions in commodity markets. On the other side of the spectrum, manipulation by speculators produces artificial prices that distort the information on the actual scarcity of physical supplies over different time periods or between markets. Manipulation jeopardizes the integrity of a market by providing participants with information that likely would lead to inefficient and socially undesirable outcomes.

A difficult but important question is how to distinguish between appropriate and inappropriate prices for both commodities and financial derivatives. A rapid rise in commodity prices *per se*, for example, should not imply that market conditions warrant governmental intervention. Let us assume that such a price movement simply reflects an unexpected rise in demand in a tight market with little producer and consumer short-term response. In a highly volatile market, such as natural gas and oil, it is important for producers, consumers and other market participants to have the ability to manage the price risks through hedging. Hedging, as repeated throughout this paper, requires speculators who are willing to take on price risk with the prospect of earning a profit.

Another scenario is one in which both the current spot price and futures prices rapidly increase because of the expectation by market investors that their investment in commodity futures, adjusted for risk, will have a higher return than other financial assets such as stocks and bonds. In this instance, the price surge may result from a “herd” effect in which speculators, acting without manipulative intent, bought large volumes of futures contracts. Some policymakers and analysts may consider this situation as one of “excessive speculation” where market participants and society in general are ill-served when prices fluctuate precipitously, either up or down. They would therefore advocate regulations limiting speculative activity, even absent evidence of market manipulation and other abuses.

An analogy is the government trying to limit price changes by firms, no matter the reason for the changes. While price caps in workably competitive markets have little economic support,

³⁷ Well-developed day-ahead and monthly spot markets for natural gas have thrived since the early 1990s. These markets have low transaction costs, but are highly volatile and unpredictable. The spot market for natural gas is a highly integrated one, especially between the East and central regions.

preventing speculative bubbles from causing rapid price changes could have more merit.³⁸ One justification could be that commercial entities, such as natural gas producers and consumers, should not have to face high price risk and suffer potentially large economic losses, from the actions of supposedly peripheral market players (e.g., noncommercial entities) whose only motivation is to profit from financial transactions. To some observers, it is unconscionable for noncommercial traders to hold a large share of the financial positions in commodities. A counterargument is that financial speculators represent legitimate market players who like producers, marketers and other traders of physical commodities are just trying to earn a profit. Why should society single out speculators as villains when their only objective is “to make a buck.” This position assumes that speculators play by the rules and are not trying to manipulate the market or engage in abusive behavior.

The rationale for constraining non-manipulative or non-abusive speculation must rest on the premise that “excessive speculation,” whether it causes a bubble or a less severe condition, inflicts a high social cost not internalized by speculators themselves. One external cost would be a slowdown of the economy when the bubble inevitably bursts, causing a downturn in the financial markets and the overall economy. Another cost, less extreme, would result from commercial entities incurring additional risk-managing costs because of highly volatile and unpredictable prices.

What constitutes “excessive speculation” relates to the major policy question of CFTC’s responsibility to protect the public: Should it protect the public against only manipulative and abusive practices by speculators, or should the CFTC also protect the public against a “high volume of speculation” that could cause a bubble and other abnormal market outcomes?

A 2007 U.S. Senate report recommended new legislation to combat what it terms “excessive speculation.” It succinctly expressed the concern over excessive speculation:

In general, speculative trading brings greater liquidity to the futures market, so that companies seeking to hedge their exposure to commodity prices can find counterparties willing to take on those price risks. Speculative purchases of futures contracts can also, in effect, finance the production and storage of the underlying commodity to meet future demand. On the other hand, large speculative buying or selling of futures contracts can distort the market signals

³⁸ One proposal is to limit institutions’ (e.g., pension funds’, hedge funds’, universities’) speculating with financial derivatives in commodities.

regarding supply and demand in the physical market or lead to excessive price volatility, either of which can cause a cascade of consequences detrimental to the overall economy.³⁹

III. Current issues and concerns about speculation in energy markets

A big concern regarding speculation in energy markets is its effect on the prices consumers pay for oil and natural gas. The worry is that financial investors will shift their money from stocks, bonds, and real estate to energy futures and other financial derivatives and, in the process, drive up the price of energy for homes and businesses. Another concern is the efficacy of federal regulators in detecting and preventing manipulation and other market abuses by financial speculators in energy markets.⁴⁰ A third concern is the inability of regulators to prevent “excessive speculation” that could lead to a bubble, making energy prices highly volatile and unpredictable.

A. Several factors explain the movement and volatility of natural gas and oil prices

Since the beginning of 2008, the U.S. has seen large fluctuations in natural gas spot and futures prices. Many industry experts project continued high price volatility for the foreseeable future: they see even moderate changes in supply or demand producing large fluctuations in price, partially because of the weak short-run response of both the supply and demand for natural gas to price changes.⁴¹ This outcome was evident in 2008, when prices rose rather sharply during the first several months and then fell almost as sharply starting around the early part of summer. As of early summer, spot gas prices were in the \$12-13 per MMBtu range, which were the highest they had ever been for that time of year. The fear was that if prices remained that high through the upcoming winter or rose even higher, natural gas would become unaffordable for an increasing number of residential customers. But then, around midsummer, prices started to drop. According to the U.S. Energy Information Administration, the decline in price resulted from the combination of a drop in oil prices, mild summer temperatures, and a larger-than-

³⁹ Permanent Subcommittee of Investigations, United States Senate, *Excessive Speculation in the Natural Gas Market*, Staff Report, with Additional Minority Staff Reviews, 2007, 3.

⁴⁰ For self-regulatory organizations such as NYMEX, the concern centers on the compliance and enforcement activities of their staff.

⁴¹ Basic economic principles say that a market in which supply increases at a higher pace and demand adjusts more quickly in response to changing prices will produce lower and less volatile prices.

expected increase in domestic gas production.⁴² Another explanation comes from reports about the production of abundant supplies of shale gas, in particular in the Barnett Basin, at less than \$7 per Mcf.⁴³ As of late October, the Henry Hub had fallen to around \$6.50 per MMBtu. Winter NYMEX futures prices have dropped to less than \$7.00 per MMBtu from levels of close to \$14 per MMBtu back in early July.

This paper offers no independent analysis of why natural gas prices have exhibited high volatility and an upward trend over the last several years. It recognizes—consistent with the views of most industry analysts—that different factors account for this phenomenon, arguably the most important being those that affect physical supply and demand conditions in the natural gas market. To repeat a point made earlier, in a tight market, natural gas prices are especially sensitive to market fundamentals, making prices both volatile and susceptible to prediction error. Market fundamentals include aggregate storage levels,⁴⁴ consumer response to price changes, weather, the cost of gas exploration and production, oil prices, general economic conditions, and regional pipeline capacity relative to demand.

Aggravating price volatility for natural gas is a mutable market characterized by a fear of adverse events. One such event in the early summer of 2008 was the possibility of a major hurricane later in the year that would cause supply disruptions and drive up prices. This fear would tend to increase both the present spot price and futures prices.

Pertinent to this paper is the role of financial speculation in affecting the price of natural gas. Some industry observers blame speculation in financial derivatives by noncommercial market participants (e.g., hedge funds, pension funds, and other institutional investors) for the volatility and rise in natural gas prices. Speculation in energy markets by noncommercial entities, including natural gas, has increased dramatically. With falling interest rates and equity returns along with declining house prices, investors (including hedge funds) looked for new places to put their money. One attractive place is financial derivatives in commodities, which have paid high returns, relative to securities and real estate.

The large shift of financial assets to energy markets has raised concerns about its effect on oil and natural gas prices. Studies and testimony before Congress present contrasting views

⁴² See <http://www.eia.doe.gov/emeu/steo/pub/contents.html>.

⁴³ At around the same time that natural gas prices started to drop, the prices of other commodities began to fall as well. These commodities include oil, agricultural products, and metals. One explanation for these parallel price declines is the downturn of the world economy exacerbated by the credit squeeze driving countries into deep recessions.

⁴⁴ Empirical evidence over the past several years shows a high (negative) correlation between natural gas prices and the deviation in aggregate storage levels from the historical five-year average.

and evidence of the relationship between financial speculation and commodity prices. Some analysts contend that financial speculation has at most a transitory and weak effect on prices; other analysts contend that the effect is longer-term and robust. In July 2008, Chairman of the Federal Reserve Board Ben Bernanke testified before a Senate committee on the topic of speculation in oil markets. He told a Senate Committee that:

[A] concern that has been raised is that financial speculation has added markedly to upward pressures on oil prices. Certainly, investor interest in oil and other commodities has increased substantially of late. However, if financial speculation were pushing oil prices above the levels consistent with the fundamentals of supply and demand, we would expect inventories of crude oil and petroleum products to increase as supply rose and demand fell. But in fact, available data on oil inventories show notable declines over the past year. This is not to say that useful steps could not be taken to improve the transparency and functioning of futures markets, only that such steps are unlikely to substantially affect the prices of oil or other commodities in the longer term.⁴⁵

A 2007 report by the Government Accountability Office (GAO) expresses ambiguity regarding the effect on the oil and gas physical markets of recent trends toward higher and more volatile energy futures prices and significant growth in the number of noncommercial traders:

We found that views were mixed about whether these trends had any upward pressure on prices. Some market participants and observers have concluded that large purchases of oil futures contracts by speculators could have created an additional demand for oil that could lead to higher prices. Contrary to this viewpoint, some federal agencies and other market observers took the position that speculative trading activity did not have a significant impact on prices. For example, an April 2005 CFTC study of the markets concluded that increased trading by speculative traders, including hedge funds, did not lead to higher energy prices or volatility. This study also argued that hedge funds provided increased liquidity to the market and dampened volatility. Still others told us that while speculative trading in the futures market could contribute to short-term price movements in the physical markets, they did not believe it was possible to sustain a speculative “bubble” over time, because the two markets were linked and both responded to information about changes in supply and demand caused by such factors as the weather or geographical events. In the view of these

⁴⁵ Chairman Ben S. Bernanke, *Semiannual Monetary Policy Report to the Congress*, before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, July 15, 2008.

observers and market participants, speculation could not lead to artificially high or low prices over a long period of time.⁴⁶

The high correlation that studies have found between financial trading and volatile energy prices *per se* does not prove a large (or any) influence of speculation on price.⁴⁷ Industry, regulatory and other analysts disagree on whether and the extent to which this evidence shows speculation affecting energy prices.⁴⁸ The high correlation does not prove, for example, that the surge in trading caused volatile prices or those volatile prices caused more trading.⁴⁹ In other words, are high prices caused by an increase in speculation, or do more speculators enter the market when prices become more volatile because that is when profit opportunities arise? The first phenomenon would support the claim that speculation has exacerbated price increases and

⁴⁶ United States Government Accountability Office, *Energy Derivatives: Preliminary Views on Energy Derivatives Trading and CFTC Oversight* (GAO-07-1095T), July 12, 2007, 9.

⁴⁷ Demonstrating causation between positions changes and market prices requires:

[An analysis of] of the interaction between daily price changes and position changes...to examine directly whether various groups of traders change positions in advance of price changes. Intuitively, in order to realize gains from price changes, positions must be established prior to those price changes. Prices then may respond to those positions, or more precisely, the signal conveyed on establishing those positions. If specific trader categories were systematically establishing positions in advance of profitable price movements, then a pattern of position changes preceding price changes would emerge. Conversely, evidence of price changes leading position changes would suggest that some market participants actively adjust their positions to reflect new information. Price changes that systematically precede position changes indicate reactive behavior by a particular trading group. [Interagency Task Force on Commodity Markets, *Interim Report on Crude Oil* (Washington, D.C.: Interagency Task Force on Commodity Markets, July 2008), 27.]

⁴⁸ Some economists and analysts argue that rising speculative activity has had a major effect on the surge in energy, metal, and agricultural prices in recent years.

⁴⁹ A group of four attorneys general from the Midwest issued a 2006 report that described U.S. natural gas prices as “wacky,” unrelated to supply and demand, and subject to “irrational swings.” The report noted a “striking correlation between large increases in trading and increases in the volatility and level of natural gas prices.” But reasonable people can dispute the interpretation of this finding: Market volatility and rising gas prices may have induced more trading of financial derivatives, rather than the other way around. (See Mark N. Cooper, *The Role of Supply, Demand and Financial Commodity Markets in the Natural Gas Price Spiral*, prepared for the Midwest Attorneys General Natural Gas Working Group, March 2006.)

volatility; the second phenomenon would imply that speculators merely react to price changes, rather than initiate price changes through their actions.⁵⁰ Although the evidence is inconclusive regarding the role of speculation in affecting energy prices, the possibility exists that speculation has pushed up natural gas prices in recent years beyond levels explainable by physical supply and demand conditions alone.

One plausible view is that natural gas prices have increased and become more volatile mainly because of the combination of rising cost of producing natural gas in the U.S. and Canada and a tight physical market. Natural gas from new domestic sources has had to struggle to compensate for declining production from existing sources in order to meet growing demand. Even if financial speculation has had a large effect on price, it is unreasonable to assume that natural gas prices would ever return to their pre-2000 levels in the absence of speculation. More uncertain is the effect financial speculation has had on exacerbating the price dynamics seen since 2000.

B. A call for Congressional action and its rationale

The major crisis in the U.S. credit markets has raised the question of whether: (1) Congress should pass legislation to require more regulation, or (2) the federal agencies responsible for regulating financial markets should improve their accountability and effectiveness in enforcing existing laws and regulations. If reform is justifiable, then one or both remedies warrant serious consideration. Some critics argue that while financial regulation has produced myriad laws, it has failed to avert disaster. One solution advocated by some experts is to regulate more effectively to ensure the avoidance of any future crises. Another solution is to first admit that regulators lack the resources and knowledge to evaluate all market transactions, and then attempt to set priorities to target outright fraud and manipulations as well as to

⁵⁰ The following statement from a study of oil markets articulates this view:

The Task Force's preliminary analysis . . . suggests that changes in the positions of swap dealers and noncommercial traders most often followed price changes. This result does not support the hypothesis that the activity of these groups is driving prices higher. The Task Force has found that the activity of market participants often described as "speculators" has not resulted in systematic changes in price over the last five and a half years. On the contrary, most speculative traders typically alter their positions following price changes, suggesting that they are responding to new information—just as one would expect in an efficiently operating market. In particular, the positions of hedge funds appear to have moved inversely with the preceding price changes, suggesting instead that their positions might have provided a buffer against volatility-inducing shocks. [Interagency Task Force on Commodity Markets, *Interim Report on Crude Oil* (Washington, D.C.: Interagency Task Force on Commodity Markets, July 2008), 5.]

encourage market transparency.⁵¹ These issues and questions readily apply to the CFTC as well as other federal regulators of financial markets.

One problem highlighted by several analysts and policymakers was passage of the Commodity Futures Modernization Act (CFMA) in 2000. Critics of this legislation point out that it reduces the authority of the CFTC to safeguard energy markets from fraud and manipulation. This Act placed much of the financial derivative market in energy outside CFTC jurisdiction.⁵² Under the CFMA, financial derivatives divide into three basic categories: agricultural, excluded, and exempt. The Act considers energy an exempt commodity because it is a physically delivered commodity but not an agricultural commodity. As an exempt commodity, energy is tradable under different institutional arrangements: (1) a Designated Contract Market (DCM), which includes NYMEX; (2) a Bilateral Exempt Market, which includes the Over-the-Counter (OTC) Market; (3) or an Exempt Commercial Market, which includes ICE.

The financial markets for energy commodities separate into two distinct venues: “futures exchanges” and “over-the-counter” markets.⁵³ Under the Commodity Exchange Act, trading of futures contracts must take place on a futures exchange regulated by the CFTC. Financial instruments falling outside the legal definition of a futures contract trade in what is commonly called the OTC (i.e., over-the-counter) market.

The major organized commodity exchanges that trade standardized contracts for natural gas and other energy commodities are NYMEX and ICE. NYMEX is a fully self-regulated futures exchange overseen by the CFTC. It must conduct regular surveillance of futures markets, ensure protection against manipulation, and insure their own financial integrity and that of their customers. ICE, in contrast, does not regulate itself and operates largely outside CFTC jurisdiction.

⁵¹ See, for example, Tyler Cowen, “Too Few Regulations? No, Just Ineffective Ones,” *The New York Times*, September 14, 2008, BU 7.

⁵² One provision of the Act, called the “Enron loophole,” allowed ICE and other electronic energy exchanges to avoid regulatory scrutiny of their over-the-counter markets. Problems with uneven regulation of energy financial derivatives, highlighted by the Enron and Amaranth incidents, led to passage of legislation in 2008. The new legislation, part of the 2008 Farm Bill, closed the loophole by providing the CFTC with additional oversight of electronic trading platforms such as ICE.

⁵³ In recent years, the over-the-counter market has grown rapidly partially because it allows transacting parties to customize financial derivatives such as swaps to meet their needs. Because futures contracts are standardized, they greatly limit the ability of parties to negotiate terms and conditions.

A U.S. Senate investigation in 2007 concluded that the CFTC is not meeting its statutory mandate to prevent market manipulation and excessive speculation from causing “sudden, unreasonable, or unwarranted energy prices.”⁵⁴ The investigation listed three new actions that would enable the CFTC to protect energy markets from manipulation, abuses, and excessive speculation. They include: (1) requiring energy exchanges currently exempt from the CFTC’s regulatory system, such as ICE, to fall under the same statutory and regulatory requirements as the regulated exchanges, such as NYMEX; (2) strictly enforcing the statutory prohibition against excessive speculation (by, for example, setting speculative limits on futures contracts over the life of the contract, rather than just for the month that contracts expire);⁵⁵ and (3) increasing funding for improving CFTC enforcement by allowing the agency to collect user fees from the commodity markets.⁵⁶

At the time of this writing, a speculation bill had passed in the House but stalled in the Senate. The Senate likely will not take up the bill until 2009. Legislation has centered on broadening the oversight responsibilities of the CFTC, increasing margin requirements, formalizing oversight of position limits on regulated exchanges and foreign boards of trade, and regulating over-the-counter markets.⁵⁷

IV. Options for public utility commissions

The appropriate action for a commission can be determined only after assessing whether and to what extent financial speculation has led to a disruption of the natural gas market, as well as to a decline in the economic well-being of jurisdictional gas utilities and their customers. A

⁵⁴ See Permanent Subcommittee of Investigations, United States Senate, *Excessive Speculation in the Natural Gas Market*, Staff Report, with Additional Minority Staff Reviews, 2007.

⁵⁵ Speculative limits set by the CFTC generally are stricter during the spot month (i.e., the month when the futures contract matures and becomes deliverable). The reason for special treatment is that trading during the spot month is more vulnerable to unusually large positions or manipulative trading practices, each potentially causing significant price fluctuations. The CFTC defines the speculative position limit as: “The maximum position, either net long or net short, in one commodity future (or option) or in all futures (or options) of one commodity combined that may be held or controlled by one person (other than a person eligible for a hedge exemption) as prescribed by an exchange and/or by the CFTC.”

⁵⁶ Bills sponsored both in the House and Senate as of September 2007 would authorize the CFTC to hire 100 full-time employees to assist with enforcement.

⁵⁷ Stanford Group Company, “Speculation Bill Heads for House Floor,” *Washington Energy Bulletin*, September 18, 2008.

commission may believe, for example, that federal agencies have not adequately protected consumers and the public against manipulation or the calamitous outcome of a speculative bubble. An appropriate action for these commissions might include petitioning Congress for broader or tighter regulations that would address their concerns.

A commission also may wish to examine how financial speculation by hedge funds and other investors affects a gas utility's procurement and hedging strategies. If in fact speculation and its proliferation over time have led to more volatile and extreme wholesale gas prices, this outcome would have definite implications for a utility's management of the increased price risk. The utility, for example, might want to engage in more hedging and to design its hedging plan with the major objective of avoiding extremely high prices that can result from "excessive speculation." While a commission should not fault a gas utility for any negative market outcomes from speculation—for example, extremely volatile wholesale natural gas prices—it can hold the utility accountable for how it responds to the actual condition it faces. A commission should seriously consider continuously monitoring, and requiring gas utilities to monitor, wholesale gas prices for any abnormal movements not explicable by physical supply-and-demand factors.

Commissions want to assure the general public that the utility is prudent and efficient in purchasing gas, in addition to hedging with financial derivatives. The typical utility purchases physical gas from brokers, other middlemen, producers, and others. The utility may buy some gas in the spot market (day or month ahead) and some under contract (usually with a less-than-one-year duration). The utility may overlay these purchases (especially for spot gas) with financial derivatives to hedge the price. The typical utility also buys gas during the off-peak season for storage and then releases this gas during the winter heating season. Given this background, a commission might want to ask a utility the following questions:

1. What are your plans for purchasing gas over the next one to two years?
2. What prices are you projecting for gas from the different sources available to you?
3. What is the basis for your price projections? Do you have internal models for projecting price, do you rely on a consultant, or do you rely on government projections (for example, Energy Information Administration)?
4. How do you measure the uncertainties of your price projections? How do you incorporate these uncertainties into your gas procurement and hedging decisions?
5. Has your utility done any independent analysis, or contract for analysis, that quantifies or at least qualifies the separate effects of *financial speculation* and market demand-and-supply factors on past wholesale gas prices and on your price projections?
6. What is your level of familiarity with present federal regulation of *financial speculation* in the gas commodity market? What modifications to present regulatory authority and practices would you make?

7. If you believe that *financial speculation* has a large impact on market prices, how would that affect your hedging and procurement decisions?

Educating a commission on speculation may lead to no new action. A commission may conclude that speculation has posed no serious problem and that federal agencies are doing the best they can to prevent manipulation in financial derivative markets. A commission also may feel satisfied that gas utilities under its jurisdiction have adequately responded to price volatility, some of which attributable to speculators, through their hedging and gas procurement practices.

Appendix: Glossary of Terms

- 1. Commodities Futures Trading Commissions (CFTC):** A federal regulatory agency authorized under the Commodity Futures Trading Commission Act of 1974 to regulate futures trading in all commodities. The commission has five commissioners, one of whom is designated as chairman, all appointed by the President, subject to Senate confirmation. The CFTC is independent of the Cabinet departments. (source: NYMEX)
- 2. Counterparty:** The opposite party in a bilateral agreement, contract, or transaction, such as a swap. Counterparty risk is the risk associated with the financial stability of the opposite party. (source: CFTC)
- 3. Exempt commodity:** The Commodity Exchange Act defines an exempt commodity as any commodity other than an agricultural commodity. Examples include energy commodities and metals. (source: CFTC)
- 4. Financial derivative:** A financial instrument derived from a cash market commodity, futures contract, or other financial instrument. Derivatives can be traded on regulated exchange markets or over-the-counter. For example, futures contracts are derivatives of physical commodities, options on futures are derivatives of futures contracts. (source: NYMEX)
- 5. Hedge:** The initiation of a position in a futures or options market that is intended as a temporary substitute for the sale or purchase of the actual commodity. It includes the sale of futures contracts in anticipation of future sales of cash commodities as a protection against possible price declines, or the purchase of futures contracts in anticipation of future purchases of cash commodities as a protection against the possibility of increasing costs. A hedger is a trader who enters the market with the specific intent of protecting an existing or anticipated physical market exposure from unexpected or adverse price fluctuations. (source: NYMEX)
- 6. Intercontinental Exchange (ICE):** The Intercontinental Exchange is an entity that operates global commodity- and financial-products marketplaces, including the world's leading electronic energy markets. ICE operates its over-the-counter (OTC) electronic platform as an exempt commercial market under the Commodity Exchange Act and the regulations of the Commodity Futures Trading Commission (CFTC). The CFTC generally oversees the trading of OTC derivative contracts on the ICE platform. As an exempt commercial market, ICE is required to comply with the access, reporting and record-keeping requirements of the CFTC. ICE's OTC business is not otherwise subject to substantive regulation by the CFTC or other U.S. regulatory authorities. (source: ICE)
- 7. Liquidity:** A market is liquid when it consummates selling and buying with minimal effect on price. (source: CFTC)

8. **Manipulation:** Any planned operation, transaction, or practice that causes or maintains an artificial price (i.e., a futures price that is higher or lower than it would have been if it reflected the forces of supply and demand). Manipulation can occur, for example, when traders make unusually large purchases or sales of a commodity or financial derivative in a short period of time, with the intent to distort prices, or to disseminate false information in order to distort prices. (source: CFTC)
9. **New York Mercantile Exchange (NYMEX):** The world's largest physical commodity futures exchange and the preeminent trading forum for energy and precious metals. Trading is conducted in commodity futures and options. Transactions executed on NYMEX avoid the risk of counterparty default because its clearinghouse acts as the counterparty to every trade. NYMEX initiated the development of energy futures and options contracts in 1978 as a means of bringing price transparency and risk management to markets. (source: NYMEX)
10. **Options:** A contract that gives the buyer the right, but not the obligation, to buy or sell a specified quantity of a commodity or other instrument at a specific price within a specified period of time, regardless of the market price of that instrument. (source: CFTC)
11. **Over-the-counter (OTC):** The trading of commodities, contracts, or other instruments not listed on any exchange. OTC transactions can occur electronically or over the telephone. (source: CFTC)
12. **Price discovery:** The process of determining the price level for a commodity based on supply and demand conditions. Price discovery may occur in a futures market or cash market. It also refers to the manner of making prices visible and readily available to the public. (source: CFTC, NYMEX)
13. **Speculation:** An activity aimed at achieving profits through the successful anticipation of price movements. (source: CFTC)
14. **Speculative bubble:** A rapid run-up in prices caused by excessive buying that is unrelated to any of the basic, underlying factors affecting the supply or demand for a commodity or other asset. Speculative bubbles are usually associated with a "bandwagon" effect in which speculators rush to buy the commodity (in the case of futures, "to take positions") before the price trend ends, and an even greater rush to sell the commodity (unwind positions) when prices reverse. (source: CFTC)
15. **Speculative limit:** The maximum position, either net long or net short, in one commodity futures or options, or in all futures or options of one commodity combined, which may be held or controlled by an entity without a hedge exemption as prescribed by NYMEX or the CFTC. (source: NYMEX)

16. **Swap:** A custom-tailored, individually negotiated transaction designed to manage financial risk, usually over a period of one to twelve years. Swaps can be conducted directly by two counterparties, or through a third party such as a bank or brokerage house. The writer of the swap, such as a bank or brokerage house, may elect to assume the risk itself, or manage its own market exposure on an exchange. (source: NYMEX)